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## U.S. College and University Student Health Screening Requirements for Tuberculosis and Vaccine-Preventable Diseases, 2012

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### Abstract

**Objective**—Colleges are at risk for communicable disease outbreaks because of the high degree of person-to-person interactions and relatively crowded dormitory settings. This report describes the U.S. college student health screening requirements among U.S. resident and international students for tuberculosis (TB) and vaccine-preventable diseases (VPD) as it relates to the American College Health Association (ACHA) Guidelines.

**Methods/Participants**—In April 2012, U.S. college health administrators (N=2858) were sent online surveys to assess their respective school's TB screening and immunization requirements.

**Results**—Surveys were completed by 308 (11%) schools. Most schools were aware of the ACHA immunization (78%) and TB screening (76%) guidelines. Schools reported having policies related to immunization screening (80.4%), immunization compliance (93%), TB screening (55%), and TB compliance (87%).

**Conclusion**—Most colleges were following ACHA guidelines. However, there are opportunities for improvement to fully utilize the recommendations and prevent outbreaks of communicable diseases among students in colleges.

### Background

Applicants for permanent U.S. residency are required by law to have a pre-arrival medical evaluation by a physician contracted to the U.S. Department of State [1]. However, no laws require temporary visitors, including international students, to have a health screening or

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obtain vaccinations before arrival. International students may contribute to the burden of TB [2] and VPD [3] in the U.S.

Colleges are at risk for communicable disease outbreaks because of the high degree of person-to-person interactions (physical contact and exchange of bodily fluids) and relatively crowded dormitory settings, according to the Centers for Disease Control and Prevention (CDC). [4-6] In the 2012/2013 school year, U.S. colleges and universities enrolled approximately 820,000 international students [7], some of which have not taken any health related precautions before traveling [8, 9]. A large proportion of incoming international students are from China, India and South Korea which have some of the highest incidence rates of TB in the world. [7] In the last decade, there have been multiple communicable disease outbreaks, including measles [10], mumps [4], pertussis [11] and meningococcal [12] among adolescents and college students in the U.S. Vaccine coverage for these communicable diseases among adolescents remain low. [13-16].

ACHA publishes recommendations for TB screening [17] and prematriculation immunization requirements (PIRs) [18] to help colleges and universities develop comprehensive student health policies to mitigate disease transmission [19]. Previous evaluations have assessed recommendations for TB screening and PIRs among U.S. colleges and universities [20, 21], but these evaluations were conducted more than two decades ago and did not include international students. ACHA requested technical assistance from CDC to develop a survey to assess student TB screening and immunizations policies and procedures at U.S. colleges and universities that enroll international students.

## Methods

### Participant Identification

In September 2011, we obtained a list of 3808 U.S. colleges and universities (undergraduate, graduate, and specialized programs) eligible to enroll international students from the U.S. Department of Homeland Security's Immigration and Customs Enforcement Student and Exchange Visitor Program. We categorized schools on the list as ACHA and non-ACHA members. We included all member schools and selected a random sample of 1800 nonmember schools out of 2,742 based on an expected response rate of 20%. We contacted nonmember schools by telephone to obtain the name and contact information for a student health service or administrative staff member knowledgeable about the school's student health policies.

### Survey Tool and Administration

As a collaborative effort between ACHA, CDC and university health subject matter experts, a questionnaire was developed to assess the extent to which universities were following recommendations for TB screening and prematriculation immunizations. A pre-survey was sent to a small sample of universities for piloting and feedback. In April 2012, we e-mailed surveys to health center employees or administrators at identified schools and sent reminders in May and August. After two reminder e-mails, we contacted nonrespondents by telephone to confirm the email address and re-sent the survey to them. The survey instrument was a

self-administered, online questionnaire, composed of 44 questions that took approximately 15-20 minutes to complete. Respondents received a small token of appreciation (\$5 gift card to a national retail chain). CDC determined that this project was exempt from institutional review board approval.

We collected characteristic data of the colleges that included size and type of school; and services provided at the school's health center. College health administrators were asked about their awareness of ACHA's TB and immunization guidelines; the school's TB screening (questionnaire or interview) protocols, TB testing conducted, and TB compliance requirements; the school's immunization and compliance requirements; and any exemptions allowed. (Appendix). Screening criteria and vaccinations selected for analysis were based on the concern for outbreaks among college campuses and ACHA recommendations for all college students. Therefore, the analyses were not comprehensive for all screening, testing, or vaccinations available.

### Data Analysis

Descriptive analyses were performed on variables included in the survey. We categorized schools as following the ACHA guidelines if they indicated having two or more screening criteria that were consistent with the 2011 ACHA guidelines. Investigators performed all analyses by using SPSS software, version 21 (IBM, Armonk, NY), but did not compare non-ACHA with ACHA members because of the low response rate of non-ACHA schools.

### Results

A total of 308 schools completed the surveys, for an 11% overall response rate. The ACHA member response rate was 19% and the nonmember response was 6%. Affiliation with ACHA could not be determined for six schools. Student health centers were available in 85% of the respondent schools. Most respondents considered their schools to be traditional, private institutions. Schools with more than 500 international students made up 28% of the respondents. Respondent characteristics are summarized in Table 1.

### Tuberculosis

Among 263 schools with a health center, 73% offered tuberculin skin test (TST), 32% offered interferon-gamma release assay (IGRA), and 22% offered chest radiography in their health center. Most respondent schools (76%) were aware of the ACHA TB screening guidelines and more than two-thirds (68%) reported having TB screening policies. More than half (55%) of schools used a screening questionnaire for all incoming students, as recommended by ACHA guidelines. Screening criteria for TB at respondent schools included history of active TB, history of a positive TST or IGRA, history of close contact with someone who had TB, being born in a country with a high incidence of TB, and history of travel to a country that has a high incidence of TB. Of the schools that had TB screening policies, 87% also had policies to enforce compliance, such as preventing registration for the following semester if the student did not complete screening. Fifteen respondent schools reported having screening policies but did not clarify the details of their policies.

Of the 208 respondent schools with TB screening policies, the proportion of schools that screened U.S. resident students and international resident students was similar (47% and 46%, respectively). However, 46% of schools routinely conducted TB testing for international students, and 13% of schools routinely conducted TB testing for U.S. students. Eight percent of schools did not conduct TB screening or testing for international students and 40% of schools did not conduct testing for U.S. students.

## Immunizations

Vaccines offered in the health centers included influenza (74%), tetanus-diphtheria-pertussis (Tdap, 65%), hepatitis B (59%), measles-mumps-rubella (MMR, 56%), meningococcal (55%), and varicella (37%). Most respondent schools (78%) were aware of the ACHA immunization guidelines and 80% of those had an immunization requirement policy. The proportion of respondents aware of the ACHA guidelines differed for ACHA members (94%) and nonmembers (47%). Of those schools that had requirement policies, 93% had compliance policies, such as preventing registration for the following semester (33%), preventing registration for current semester (23%), restricting class attendance (16%), preventing participation in a clinical healthcare setting course (19%), and preventing participation in organized sports (6%). The percentage of respondents that had respective state immunization requirements varied by vaccine: MMR (59%); Tdap (56%); meningococcal (34%); hepatitis B (28%); and varicella (13%).

## Comment

The results of our survey showed that most respondent schools were aware of and following the ACHA guidelines. Proportions were higher among ACHA member schools. This is not surprising since ACHA would communicate directly with their member schools to provide and promote their latest recommendations. However, many schools do not have screening and immunization policies and even fewer have compliance policies. Only 59% of respondents required student's to comply with TB screening policies and only 73% of respondents required student's to comply with PIR. Colleges without these policies increase the risk for communicable disease transmission. [3, 4, 7]

Most U.S. colleges and universities are mandated by their respective states to immunize their incoming students. Thirty-two U.S. states and territories have various vaccine requirements for college entry [22, 23]. Typically respondent schools' policies were more stringent than their corresponding state requirements where state requirements existed but less so than the ACHA guidelines or Advisory Committee on Immunization Practices (ACIP) [24] recommendations. For example, in a state with a mandated requirement for MMR only, one of the schools added a requirement for varicella vaccine for all students and meningococcal vaccine for students living on campus, but not any of the other ACHA-recommended immunizations.

Although TB and some VPDs are not common in the US, international travel increases the risk of their importation [25-27]. The international student population is increasing, rising 7% from the 2011/12 to the 2012/13 school year [7] and poses a potential risk for disease importation into the U.S. from endemic countries. For example, it has been estimated that

37% of incident TB cases within the U.S. occur among students/exchange visitors and temporary workers [2]. College campuses are at risk for communicable disease outbreaks due to the large number of students from all over the world, high degree of person-to-person interactions, and relatively crowded dormitory settings [4]. China, India, and South Korea, the top three countries of origin for international students in the U.S. [7], had estimated TB incidence rates of 96, 168, and 90 cases per 100,000 population in 2009, respectively [28]. One study estimated that the rate of active TB identified through screening was 32 times higher among international students when compared to U.S. students [21].

PIRs for students have been shown to be effective in controlling disease transmission on campuses [29, 30]. However, vaccine coverage among adolescents and college students remain low. For example, vaccination coverage among adolescents are 74% for mumps (2-dose) [13], 32% for meningococcal (MCV4) [15], 58% for MMR (3-dose) [14], and 73% for pertussis [16].

The increase in international students into the U.S., the lack of medical pre-screening evaluation for international students, the low rates of vaccine coverage among adolescents, and the limited screening at college entry are potential facilitators for communicable disease transmission. Therefore, screening and immunization programs within colleges and universities need to be promoted and enforced in order to receive maximum benefits.

## Limitations

The results of our survey are subject to several limitations and should be interpreted with caution. First, as a result of our low response rate, we were unable to provide generalizable estimates or statistically compare results between ACHA and non-ACHA member schools. Although the higher response rate for ACHA members was expected, the rate for nonmembers was unexpectedly low despite multiple reminders. Anecdotally, a few respondents said they did not initially participate because they did not conduct health screening. Therefore, the proportion of schools with health screening policies may be overestimated. Second, our survey asked specifically about the 2011 guidelines. At the time of data collection, ACHA had disseminated its updated recommendations for 2012. Only a few respondents replied before the release of the new guidelines and we are unclear as to the effect of the new guidelines on our results. Third, our survey did not ask country of origin for their international students who attended the schools. Therefore, we were unable to assess which schools had a higher risk based on higher endemic levels of TB or other VPD of the students' country of origin. Finally, the survey did not address the differences between latent tuberculosis infection (LTBI) and TB disease however ACHA recommendations provide guidance to colleges about transmission and treatment for each.

## Conclusion

ACHA should be encouraged by the large proportion of schools that follow their TB and PIR guidelines. However, our study demonstrates that there are opportunities for improvement. Evaluations are needed to explore the facilitators and barriers to implementing recommended health policies among colleges and universities, specifically related to knowledge, resources, or overall college priorities. At the time this survey was conducted, no

states required TB screening or testing for college entry. Since then, at least one state has enacted a statute requiring TB screening and targeted testing for all higher education students and faculty [31]. Other states might follow this example to promote the health of students and prevent the spread of communicable diseases on college campuses. The literature suggests that state disease prevention programs, such as state-mandated vaccine requirements and screening programs in schools prevent outbreaks of students in colleges and universities [29, 32, 33]; national organizations, such as ACHA, that promote such programs may increase that effect [19, 34].

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**Table 1**

Characteristics of U.S. colleges and universities that participated in a 2012 survey of health screening requirements

<b>Characteristics of Participatory U.S. Colleges and Universities in 2012*</b>		<b>Total N=308</b>		<b>Non-ACHA N=100</b>		<b>ACHA N=202</b>	
		<b>N</b>	<b>(%)</b>	<b>N</b>	<b>(%)</b>	<b>N</b>	<b>(%)</b>
Campus Size	<2500	121	39.5	53	57.0	57	29.5
	2500-4999	44	14.4	18	19.4	24	12.4
	5000-9999	46	15.0	15	16.1	29	15.0
	10000-19999	49	16.0	4	4.3	44	22.8
	20000+	46	15.0	3	3.2	39	20.2
International students	<20	41	14.8	23	28.4	16	9.0
	20-50	50	12.0	19	16.4	28	15.8
	51-160	55	13.2	18	15.5	28	15.8
	161-500	55	13.2	19	16.4	35	19.8
	501-3000	64	15.4	2	1.7	58	32.8
Institution	>3000	12	2.9	0	0.0	12	6.8
Type of School	Public	139	45.3	35	37.2	96	49.7
	Private	168	54.7	59	62.8	97	50.3
Is there on-campus housing?	Traditional	226	74.3	52	55.9	163	85.3
	Other	78	25.7	41	44.1	28	14.7
Degrees offered **	Yes	258	84.0	64	68.8	180	92.8
	B, M, D	99	32.6	11	11.8	84	43.3
	A, B, M, D	11	3.6	0	0.0	11	5.7
	B, M only	90	29.6	29	31.2	53	27.3
	B only	36	11.8	17	18.3	19	9.8
	A only	43	14.1	23	24.7	15	7.7
Aware of ACHA TB Guidelines	Graduate only	25	8.2	13	14.0	12	6.2
	Yes	233	76.4	41	44.1	180	93.8
Have TB policy	Yes	208	67.5	49	52.1	141	72.7
Aware ACHA Immun <sup>‡</sup> Guidelines	Yes	235	76.5	44	46.8	181	93.8
Have Immun <sup>‡</sup> Policy	Yes	243	79.2	62	66.0	166	86.0

\* Some participants did not respond to all questions;

<sup>‡</sup> Immunization

\*\* A - Associate B - Bachelor, M - Master, D - Doctorate